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54 Title: Intake filter for a pond pump

57 An intake filter that is connectable to a pond pump via a suction line is characterized in that a pillow cover (10) made of coconut fiber material is available whose interior is connectable to the suction line (40), that pillow cover 10 furthermore has an outer and inner mat (12, 14) made of coconut fiber material and that additional coconut fibers (22) are disposed between the outer and inner mat (12, 14).

Description

TECHNICAL FIELD

The invention relates to an intake filter that is connectable to a pond pump via an intake line. Pond pumps are used in order to maintain a circulation of water for as long as possible. The flow of a water course, for example, may thereby be emulated. The required water is continually drawn from the pond and returned back into the pond. Intake filters connected upstream of the pond pump are supposed to prevent dirt from being taken in by the pump together with the water.

BACKGROUND INFORMATION

Intake filters that are connectable to a pond pump via a suction line are known. They consist of a housing in which a filter medium is present. This filter medium may be composed of gravel particles of various diameters. In addition to these natural filters, sieve-like filter media made of metallic materials, for example, are also known.

An intake filter of the species is known from DE-PS 38 22 158. This filter comprises a drainage pipe wrapped with coconut fibers. The size of the filter surface is a function of the size of the pipe diameter.

DESCRIPTION OF THE INVENTION

Starting from this state of the art, the object of the present invention is to specify an economic, simple, ecological and as effective as possible intake filter for pond pumps.

This invention is specified by the features of Claim 1. The invention is distinguished in that the intake filter has a pillow cover made of coconut fiber material whose interior space may be connected to the suction line of the pond pump. In this context, this pillow cover has an outer and inner mat made of coconut fiber material, additional coconut fibers being disposed between the outer and inner mat. An intake filter of this type, due to its pillow-type or mat-type form, not only has a filter medium with a large surface, but, due to the multiplicity of coconut fibers, has a very large inner surface so that dirt, algae, plant parts and other impurities present in the pond water can reliably be withheld and therefore filtered out of the water. The degree of effectiveness of a pond pump may therefore be maintained without maintenance work over a comparatively long time period.

Moreover, the intake filter made of coconut fibers, due to its large inner surface produced from a fabric of multiple layers and fiber fill, offers ideal conditions for the colonization of serious microorganisms. These microorganisms are required to clear out nitrogen present in chemical fertilizers and in this way are used for the biological balance of the pond. The natural fiber coconut is an ecological component from any perspective because it is a purely natural product that can easily be composted at the end of its service life. The coconut

fiber, a raw material that grows naturally in sufficient quantities, may be harvested and processed in an environmentally friendly manner. Furthermore, it is already naturally resistant to pests and funguses and can therefore be used untreated. Furthermore, its technical use is promoted by its relatively high strength and long life.

The pillow-shaped configuration of the intake filter of the invention allows any desired placement on the pond bottom. The position of the intake filter may also be permanently arranged simply by weighing it down with a substrate or stones.

It has proven advantageous to produce the outer and inner mat of the intake filter each from a fabric made of coconut threads, the coconut threads in turn made up of a plurality of coconut fibers. Additional coconut fibers can then be added as filling in a simple way between the outer and inner mat of the top and bottom pillow cover. These additional coconut fibers may be disposed as desired in the interior. In this way all of them or part of them may be added in as a loose filling; however, they may also be gathered into multiple tufts, it being possible then to attach the tufts to one of the outer or inner mats. The attachment may be effected in a simple manner by all or some tufts being wrapped around warp or weft threads of the outer and/or inner mat so that their loose ends project into the interior of the pillow.

The pillow cover preferably comprises two mats and specifically an outer and an inner mat. These two mats of the top or bottom pillow cover are permanently connected to each other along the pillow perimeter, which can be simply accomplished, for example, without any problem and also in an ecological manner by tying them in using coconut fibers.

The plurality of mats of the pillow cover may also be produced by folding of mat parts. In this way, for example, of the top and bottom pillow covers, each comprising two mats, the two inner mats and/or the two outer mats may each be joined to each other to form one piece. The four mat layers may be produced then from two mats. The mats are then present in folded form in one pillow perimeter side. Furthermore, four mats lying one on top of the other, for example, may also be produced from a single mat by repeated folding. In each case, there should be a tying in of the mat areas that abut each other or overlap each other in the pillow perimeter in order to prevent the pillow filling from slipping. In the slippage of the pillow filling, the filler material made of coconut fiber that is disposed in the interior between the two inner mats in particular could slip out from the area of a drainage pipe and thereby diminish the filtering effect in this area. In order to prevent this, the top and bottom pillow cover forming, for example, both mats could be individually stepped to counteract the possibility of the pillow filling slipping.

In the arrangement of a pipe connected to an outer suction line, such as even a drainage tube, for example, in the intermediate space between the top

and bottom pillow covers, one must ensure that the water sucked into the tube must flow past the filling of the pillow cover, the coconut fibers, that is, that are loosely arranged between the outer and inner mat. For this reason, the pillow cover surrounds the area of the pipe or the suction pipe that penetrates the pillow cover as tightly and firmly as possible.

A simple design of the intake filter for the purpose of connection to a suction line is characterized in that the suction pipe having at least one transverse connecting branch may be passed through the pillow cover and connected to the at least one pipe or drainage pipe that may be present in the interior of the pillow. The suction pipe may include, for example, a T-piece that can be firmly mounted in the pillow together with its connecting branches. The pipe or drainage pipe, which may be attached to the connecting branch via, for example, a plug connection may be present in the pillow with a 180-degree bend so that two ends of the tube may be connected to the suction line via, for example, two T-pieces projecting into the pillow. In this way a plurality of pillows may be connected in succession on the suction pipe. It is also possible to connect pillows opposite each other via double T-pieces.

The connecting parts of the suction line or the suction line itself may be made of plastic or even brass. Standard commercially available pumps may be used as pond pumps. Of course, the connecting parts must be configured in such a way that they fit on the connection areas of existing pond pumps.

The aforementioned pipe, which may be arranged in the interior of the mat-type intake filter, may be used for the extension of the suction line protruding into the pillow or beyond that also as a spacer between the two inner mats of the pillow. The pipe by its presence prevents the two inner mats from constantly lying flat against each other and thereby impairing the filtering effect. This danger is very great precisely in ponds because stones and heavy flower pots are often placed on the pond bottom, and therefore in the area in which the intake filter will normally be situated.

The spacer may, on the one hand, be formed as a pipe or even, on the other hand, as a spiral. The spiral may be attached to the free opening side of the pipe or suction pipe in order to prevent slippage within the filling.

It has proven advantageous to have two intake branches project into the interior of the pillow, which has a relatively large surface. Pipes or pipe stubs may then be connected to these two intake branches and spirals then connected to the pipe stubs. However, it is also possible, for example, to connect just a spiral to one intake branch and a pipe section to the other intake branch. The spiral does not need to extend over the entire length of the pillow.

Therefore, a section of pipe may be connected in turn to the spiral that may extend, for example, only over half the pillow length. Also it is possible to connect both suction branches via a single spiral. The spiral would then be present within the pillow, for example, in the form of a U-bend.

Instead of the spiral, or alternatively and in addition to it, the pipe may also be formed in

a manner that allows for a lot of flow-through by pipe sections with cutouts.

These openings made in the pipe are preferably only present along one pipe section. In this way provision can be made for water intake in different areas of the pipe. In this manner the water intake straight through the pillow into the suction line over the entire base area of the pillow may be controlled; the water entry into the suction line will be accomplished specifically for a closed pipe through its pipe mouth. In the spiral configuration, the water intake will occur along the entire spiral, and in a pipe with openings in a pipe section, water is taken in through this pipe section.

In order to prevent coconut fibers from ending up in the suction line, a wire-mesh-like strip of material may seal the suction opening within the pillow. The wire-mesh-like strip of material in this context may be placed directly around the opening of the suction branch, but it may also envelop the pipe or spiral that is present within the pillow. In general, it is present within the intermediate space between the two inner mats of the pillow such that it can form a filter layer between the coconut material and the suction opening. This filter effect may be realized in a simple way via a wire-mesh hose surrounding the pipe or the spiral.

If two pipes or two spirals or a plurality of spacers of this type are present in the interior of the pillow, the wire-mesh hose may be placed around the individual "spacers" as well as around all of them together.

From the preceding description it emerges that the intake filter according to the invention may also be retrofitted in existing pond systems and that any existing intake filters not conforming to the invention that may be present may also be replaced after the fact.

Additional advantages of the invention may be derived from the features further specified in the dependent claims and from the exemplary embodiments below.

BRIEF DESCRIPTION OF THE DRAWING

The invention is described in detail and explained in relation to the exemplary embodiment represented in the drawing. In the drawing,

Figure 1 shows a pillow cover of an intake filter according to the present invention,

Figure 2 shows a cross-section through an intake filter provided with a drainage pipe according to the invention,

Figure 3 shows a schematic layout for a single intake filter according to the invention connected to a suction pump,

Figure 4 shows a layout for eight intake filters individually connected to a suction line according to the invention,

Figure 5 shows a perspective view of an intake filter connected to a suction line according to the invention,

Figure 6 shows a disassembled illustration of pipe and spiral parts that are installable in a pillow cover according to the invention.

Figure 7 shows a schematic top view of different pipe and spiral parts that are installable in a pillow cover and connected to a suction line according to the invention,

Figure 8 shows an embodiment modified in relation to Figure 7,

Figure 9 shows again shows an embodiment modified in relation to Figure 7 in a cutaway view, and

Figure 10 shows another embodiment modified in relation to Figure 7.

WAYS TO IMPLEMENT THE INVENTION

Pillow cover 10 represented in Figure 1 is made of a coconut fiber material. Pillow cover 10 comprises an outer and inner mat 12, 14. Both outer mat 12 and inner mat 14 are present in duplicate, and are connected to each other by a seam 16 at their edges, which encompass the largest extent of the pillow. This seam runs around three sides of mats 12, 14 in the illustration of Figure 1. In the area of the fourth side, the pillow cover is still open in order to enable the introduction of drainage pipes 18, 20 (Figure 2) as is outlined in further detail below.

Seam 16 in the present case is produced using coconut string. Also the pillow cover is made of coconut material. Thus, the two mats 12, 14 are made up of a braid of coconut threads. The coconut threads in this context are made of a plurality of coconut fibers. Loose coconut fibers 22 are filled in between the outer and inner mats 12, 14 in each case. These coconut fibers 22 form a filling for the two-layer pillow cover. The pond water taken in through drainage pipes 18, 20 flows from outside through outer mat 12 through the filling of coconut fibers 22 and through inner mat 14, before being sucked into drainage pipes 18, 20.

In this way, an optimal cleaning effect and, thus, an optimal filter effect is achieved.

Filter element 24, which is represented in Figure 2, is made of pillow cover 10 (Figure 1) and two drainage tubes 18, 20. In the present example according to Figure 3, the two pipes 18, 20 are not enclosed at the ends in pillow 10, but connected to each other via a 180-degree bend 26. In the area of original pillow opening 28 (Figure 1), two T-pieces 30, 32 with their particular branches 34 project through pillow opening 28 into the interior of filter element 24 in the design according to Figure 3. Drainage pipes 18, 20 are each connected to these branches 34. The connection is made in the present example via a plug-type connection. After guiding branches 34 through and connecting drainage pipes 18, 20, pillow cover 10 is then sealed so that pillow cover 10 fits tightly against branches 34. Unlike drainage tubes 18, 20, branches 34 possess no penetration openings, so the water taken in must flow only into drainage pipes 18, 20 or into bow 26, and therefore must flow through filter pillow 10 along with filter medium 12, 14, 22. The arrangement of drainage tubes 18, 20 could be eliminated so that the water present between both inner mats 14 would arrive directly into branches 34.

Several T-pieces 30 and with them as many filter elements 24 as desired may be combined into associated suction line 40 since, as in the present example, its flanges 42 are put together using pipe-type coupling pieces 38. Suction line 40, which may be formed of any desired length, may then be connected to a suction pump 36.

Suction line 40 and its connecting parts to pump 36 may be made of plastic or also of brass. Suction pump 36 may be of a standard commercially available type.

In the illustration according to 4, not T-pieces 30, but rather double-T pieces 50 protrude into filter elements 24. Double-T pieces have opposing branches 34 so that a filter element 24 may be connected to a double-T piece 50 on both sides. Filter elements may therefore be connected to suction line 40 on both sides using double T-pieces 50, as is illustrated in Figure 4 with eight filter elements 24. Two double-T pieces 50 with their branches 34 project into each filter element 24 in the illustration of Figure 4. In each filter element 24, branches 34 are connected to a drainage tube 18 or 20 as already illustrated by way of example in the illustration of Figure 3.

Filter elements 24 with a length of 130 cm, a width of 30 cm and a height of 13 cm have proven, from a technical and economic perspective, to be appropriate sizes.

The filter element 24 represented in Figure 5 is connected to a suction line 40 as schematically illustrated in Figure 3.

Pillow cover 10, which is illustrated in Figure 6, corresponds to the pillow cover that has already been described. The parts that are insertable in pillow cover 10 are made up of two branches 34 that, as already previously described, are parts of T-pieces that can in turn be connected to suction line 40. Branches 34 project into pillow cover 10 and are tightly fitted in the area of pillow opening 28.

Attached to the top branch 34 in the drawing is a spiral 60. A pipe section 62 is attached to the open end of the spiral. Spiral 60 is roughly three times as long as pipe section 62. The stiffness of spiral 60 is such that it cannot be pressed together or bent flat in the interior of pillow cover 10 by rock fragments or the like falling or resting on pillow cover 10.

A pipe section 62.2 is attached to the bottom branch 34 in the drawing. A spiral 60.2 is also attached on the open end of pipe section 62.2. In the present case, pipe section 62.2 and spiral 60.2 have approximately the same length. Together, pipe section 62.2 and spiral 60.2 are approximately as long as opposing spiral 60 together with pipe section 62.

A wire mesh hose 64 is pulled over the two spirals and pipe sections. Its end face opening area 66 is firmly attached in this context either to pipe section 62.2 or to branch 34. Wire-mesh hose 64 forms a filter and prevents fiber particles released from pillow cover 10 from ending up in suction line 40 and possibly being sucked into the suction pump.

Instead of the two wire-mesh hoses 64, a common wire mesh hose of appropriate size could also be slipped over both branches 34. It would also be possible to use a wire-mesh hose that is twice as long as in the drawing and then slips over branch 34 with its one opening 66 and over the other branch 34 with its other opening. The wire-mesh hose would then be present in pillow cover 10 in a type of U-bend.

With pillow cover 10 schematically illustrated in Figure 7,

two spirals 60.4 are present in the interior that are attached, like spirals 60, to corresponding branches 34 of a suction line. Spirals 60.4 extend to approximately the entire length of pillow cover 10. They are also surrounded by wire-mesh hose 64. The wire-mesh hose 64 is also closed at its end to the right in the drawing as in the illustration of Figure 6.

In the interior pillow cover 10 as illustrated in Figure 8, a pipe section 62.2 and a spiral 60.2 are present on bottom branch 34, as is also the case in the illustration according to Figure 6. On the side above it in relation to Figure 8, a pipe section 62.2 and a spiral 60.2 are also present. However, in this case spiral 60.2 and not pipe 62.2 is connected to top branch 34. Pipe section 62.2 is then attached to the open end of spiral 60.2. Spirals 60.2 are therefore aligned diagonally rather than next to each other inside pillow cover 10. This is also true for pipe section 62.2. This means that bulges are maintained in pillow cover 10 over its entire length and width by either pipe sections 62.2 or spirals 60.2, because the pipe sections and the spirals function as spacers for the two inner mats 14 of pillow cover 10. In addition, it is achieved that from the left pillow area in Figure 8 the water is suctioned into top branch 34 and from the right pillow area the water is preferably suctioned through bottom branch 34. The water specifically is suctioned through the spirals preferably in the central area of the pillow. In addition, water arriving in the interior of the pillow cover is also suctioned through pipe opening 70 of top pipe section 62.2. The suction "points" are thereby desirably distributed inside the pillow cover. By arrangement of closed pipes and corresponding spirals, the intake areas inside the pillow can to a great extent be distributed as desired.

With pillow cover 10 according to Figure 9, there is a single spiral that is arranged in a U-bend. At its open ends, the spiral can be directly connected to branch 34 on suction line 40; however, an additional pipe section may also be connected between branch 34 and the end of spiral 60.6.

In the illustration according to Figure 10, the arrangement of spirals is omitted. The effect of the spirals is produced by a pipe section 72, which in its cover surface is provided with cutouts and therefore with openings. The cover surface of the two tubes 76 laid in the interior of pillow cover 10 is then closed on pipe section 72. Pipe sections 72 thereby form intake areas and at the same time spacers between the two inner mats 14 of pillow cover 10.

Pipe sections 72 of the two pipes 76 are offset in relation to each other so that, again, a suction effect distributed over the footprint of pillow cover 10 is achieved. Also pipe 76 together with its pipe sections 72 are enveloped by a wire-mesh hose 64 in order to prevent the entry of dirt and fiber particles into the suction line.

Claims

1. Intake filter that is connectable via a suction line to a pond

pump, wherein

- there is a pillow cover (10) made of coconut fiber material whose interior space is connectable to the suction line (40),
- the pillow cover (10) has an outer and an inner mat (12, 14) made of coconut fiber material,
- additional coconut fibers (22) are disposed between the outer and the inner mat (12, 14).

2. The intake filter as described in Claim 1, wherein

- the outer and inner mat (12, 14) are each made of coconut threads,
- the coconut threads are made of a plurality of coconut fibers,
- additional coconut fibers (22) are present as loose filling between the outer and inner

mat (12, 14).

3. The intake filter as described in Claim 1 or 2, wherein

- the additional coconut fibers are at least partially present in loose form.

4. The intake filter as described in one of the preceding claims, wherein

- additional coconut fibers (22) are gathered together into tufts,
- tufts are attached to at least one of the outer or inner mats (12, 14).

5. The intake filter as described in Claim 4, wherein

- tufts are wrapped around warp or weft threads of the mats (12, 14).

6. The intake filter as described in one of the preceding claims, wherein

- of the top and bottom pillow covers, each of which is made of at least two mats (12, 14),

the two inner mats (14) and/or the two outer mats (12) are each joined to each other as one piece.

7. The intake filter as described in one of the preceding claims, wherein

- the top and bottom pillow covers, each of which is made of at least two mats, are formed by repeated folding of a single mat.

8. The intake filter as described in one of the preceding claims, wherein

- the mats are firmly joined to each other by a tying together (16) using coconut threads in the area of the pillow perimeter.

9. The intake filter as described in one of the preceding claims, wherein

- in the intermediate space between the two inner mats (12, 14) at least one pipe equipped with at least one opening (18, 20), which is connectable to suction line (40), is present,
- the pillow cover (10) tightly surrounds the area (34) of the pipe that penetrates the

pillow cover (10).

10. The intake filter as described in one of the preceding claims, wherein

- the suction line (40) together with at least one transverse branch (34) may be introduced from without through the pillow cover into the interior of the pillow.

11. The intake filter as described in one of the preceding claims, wherein
 - a drainage pipe (18, 20) that is connectable to the suction line (40) is present in the intermediate space between the two interior mats (14).
12. The intake filter as described in Claim 11, wherein
 - the pipe (18, 20) is present in the pillow with a 180-degree bend (26),
 - the two ends of the pipe are connectable to the suction line (34, 30, 32, 50, 40)
13. The intake filter as described in one of the preceding claims, wherein
 - multiple pillows (24) are connectable in succession and/or opposite the suction pipe (40).
14. The intake filter as described in Claim 9, wherein
 - a spacer is present between the two inner mats (14) in such a manner that a completely flat placement of the two inner mats (14) against each other is not possible.
15. The intake filter as described in Claim 14, wherein
 - the spacer is formed in the manner of a spiral (60)
16. The intake filter as described in Claim 15, wherein
 - the one end of the spiral (60) is attached to the opening of the pipe that is connected to the intake line.
17. The intake filter as described in Claim 14 or 15, wherein
 - both ends of the spiral (60) are attached to a pipe or a pipe section.
18. The intake filter as described in Claim 14, wherein
 - at least two pipe connecting branches (34) that are connectable to the suction line project into the interior of the pillow cover (10),
 - an additional pipe (62) is connected to at least one of these two branches (34),
 - in the additional pipe (62) a pipe section (72) is formed with openings (74) in its pipe wall,
 - this pipe section (72) with openings (74) in the case of two additional pipes (76) are present not next to each other, but offset in relation to each other along the pipe longitudinal axes.
19. The intake filter as described in one of the preceding claims, wherein
 - a wire-mesh-type material strip is present in the intermediate space between both inner mats (14) in such a manner that it forms a filter layer between the coconut material of the pillow cover (10) and the suction opening of the suction line (40).
20. The intake filter as described in Claim 19, wherein
 - the pipe (18, 20, 62) or spiral (60) present in the interior of the pillow cover (10) is surrounded by a wire-mesh hose (64).

5 pages of drawings attached

Leerseite = blank page

ZEICHNUNGEN SEITE = DRAWINGS PAGE

Nummer = Number

Offenlegungstag = Laying open to public inspection date